

**AN IMPROVED ROUTING MACHINE.**

The machine represented herewith embodies two patents issued to Mr. William H. Parry, and has been especially designed for stair builders' use in gaining the wall string to let in the treads and risers, and for dovetailing the treads to receive the balusters. In laying out the wall string, it is only necessary to lay off the face lines, as the templet, shown in Fig. 1, can be set to allow for any size of wedge the stairbuilder may wish to use. This templet is adapted to work any length of tread, either right or left hand, winders included, and when once set need not be changed again for any number of strings of that rise and tread, as the work is run under the templet and firmly held by two clamps while a tread and riser are being worked. The machine is provided with two bits, shown in Fig. 2, which work as well on hard as on soft wood. It is said that with this machine a string with sixteen or eighteen risers can be routed inside of fifteen minutes, while the cutters do not knock off the finished corners, which the stairbuilder finds it difficult to keep perfect when routing out by hand. The spindle is so arranged that all lost motion is taken up by two check nuts at the top of the spindle.

For further information relative to this machine address Mr. James H. Havens, No. 825 Eleventh Avenue, New York City.

**A Country of Small Things.**

Japan, says Mr. Frank G. Carpenter, is a country of the little. "The men here are from five feet to five feet five inches high, and the women are smaller. Notwithstanding the fact that they raise themselves three inches off the ground on their wooden sandals, I am continually looking down at them, and a fair sized American girl towers above them like an Amazon. Japanese trees are dwarfed, and, in fact, all nature seems to be made on the six by nine plan. The chickens are nearly all bantams, and the cats, with their bob-tails, look like kittens compared with our American tomnies, and the horses are ponies. The houses of the common people are but one story, and the rooms look like children's play houses. The country, though as big as several States, is full of picturesque scenery, but it is the pretty rather than the grand, and you have beautiful bits rather than sublime landscapes. It is the same with everything. If I ask for a cup of tea at a little wayside tea house, it is handed to me in a little piece of shell-like china, no bigger than an egg-cup, and the little Japanese beauty goes down on her knees when she brings it."

**IMPROVED VERTICAL CYLINDER BORING MACHINE.**

Our illustration shows a very strong and powerful vertical cylinder boring machine, made by Messrs. Francis Berry & Sons, Sowerby Bridge. This machine is capable of boring cylinders from 2 ft. 6 in. to 12 ft. in diameter and 10 ft. high, and from 17½ in. in diameter to 2 ft. 6 in. in diameter by 2 ft. 9 in. long for stuffing boxes, etc. It is fitted with a boring bar 16 in. in diameter, with one boring head about 4 ft. 11 in. in diameter, and is also fitted with a compound slide rest for facing the ends of cylinders up to 12 ft. in diameter. The boring bar is so arranged that it can be lifted out through the top bearing without disturbing the main driving gearing. The boring head can be quickly raised and lowered by hand or power. The feed is self-acting, and is made variable by a set of change wheels from 4 to 16 cuts per inch. As will be seen from the illustration, the machine stands upon a massive cast iron bed plate, truly planed, with bolt slots for fixing the work to be operated upon. It is driven by powerful worm and worm-wheel gearing, and is provided with cone pulleys and fast-and-loose pulleys. The approximate weight is 33 tons.

The machine was constructed for a large engine works at Barcelona, where it is employed in boring marine engine cylinders.—*Engineering.*

**Quick-Firing Guns for Fortresses.**

General Lord Wolseley presided at a lecture delivered at the Royal U. S. Institution, on the above subject, by Captain F. Gleadowe Stone, who in the course of his lecture said:

Our extreme vulnerability as a naval power in the days of sailing ships, when our strength by sea in proportion to that of other European powers was infinitely greater than it is now, may be gathered from the

It does not appear necessary that quick-firing guns for this kind of defense should be of very large caliber; probably a 5 inch gun, throwing a projectile of about 40 pounds, would be the maximum required, giving a penetration of 12 inches into wrought iron. Any attempt to go beyond this for the purpose of obtaining higher penetration would be misplaced, though doubtless quite feasible; in fact, a 12 pounder quick-firing gun would serve most purposes, and the results already achieved by the 6 pounder Hotchkiss are instructive on this point.

At Eastbourne a shell from one of these guns struck the chase of a 10.4 inch breech-loading gun and penetrated into the bore. At Shoeburyness a 9.2 inch breech-loading gun was struck on the chase, and a bulge of nearly half an inch raised on the interior of the bore, thus rendering it unserviceable. There are two objections commonly raised to the employment of quick-firing guns: 1. The smoke. 2. Complicated mechanism and liability to get out of order. With regard to the first point, if the smoke hangs over any gun, it is impossible to lay it, but in the case of the quick-firing gun we can at any rate get in more shots than with the ordinary gun, inasmuch as the laying is not disturbed, besides which, the fact of our powder being bad is no argument for discarding all improvements in gun making.

Other speakers advocated the use of the 6 pounder quick-firing gun. Lord Wolseley declared that, in his belief, nearly the whole of the existing fortifications in Europe were no better than if they were constructed on sand hills, in the presence of modern guns.

**Money in Inventions.**

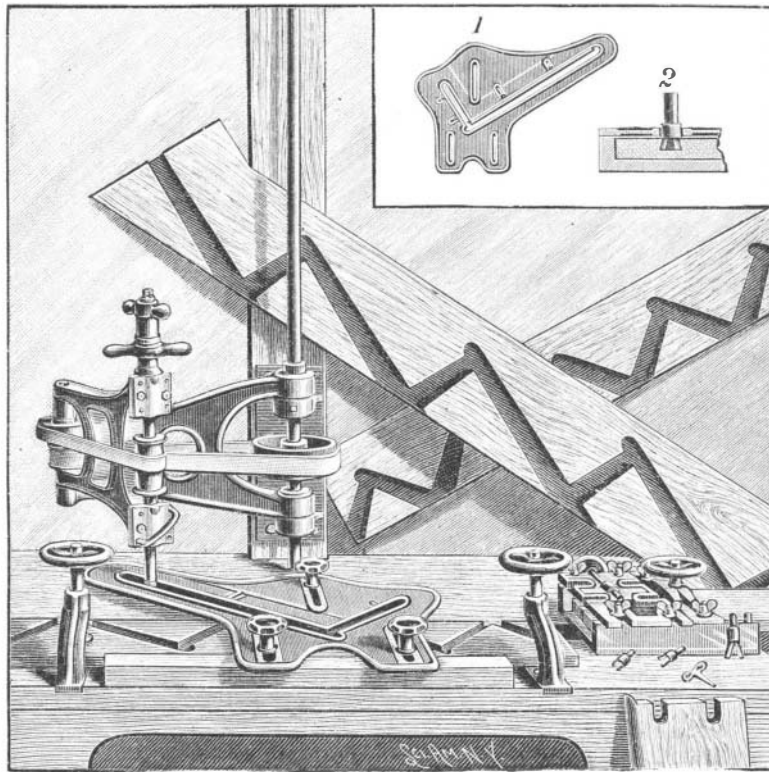
"One of the best opportunities for a young fellow to make money quickly in these days," said a self-made millionaire of this

city to the writer recently, "is to rack his brains until he has invented something useful or that the public wants. A general impression prevails that it takes a skilled engineer or a man of phenomenal inventive ability to develop anything useful to manufacturers in this age of machinery. But there is a wide field open to shrewd amateurs, so to speak, to supply little articles of convenience to housekeepers, shopkeepers, etc., and designers can be had at reasonable rates to execute the idea, once it is conceived. American women are so accustomed to getting what they want that anything which lightens their labors in the household is sure to 'go.' When I was a boy on the farm at home, my mother used to make me clean all the dinner knives on Sunday with bath brick. Now, scraping this brick into a fine powder, without lumps in it, used to be the most tedious part of the whole work. The other day I heard of a man who has made a fortune by supplying

the trade with powdered bath brick in neat packages. You know how difficult it is to pick up small coins from a wooden counter. Yet the whole civilized world has growled at and endured it since coins were stamped and counters made, until the other day a young fellow invented a rubber mat with little bristles of rubber standing up thickly all over it. Coins thrown on the mat are as easily picked up as if they stood on edge. The public was quick to appreciate it, and the inventor need not work for a living any longer."—*New York Tribune.*

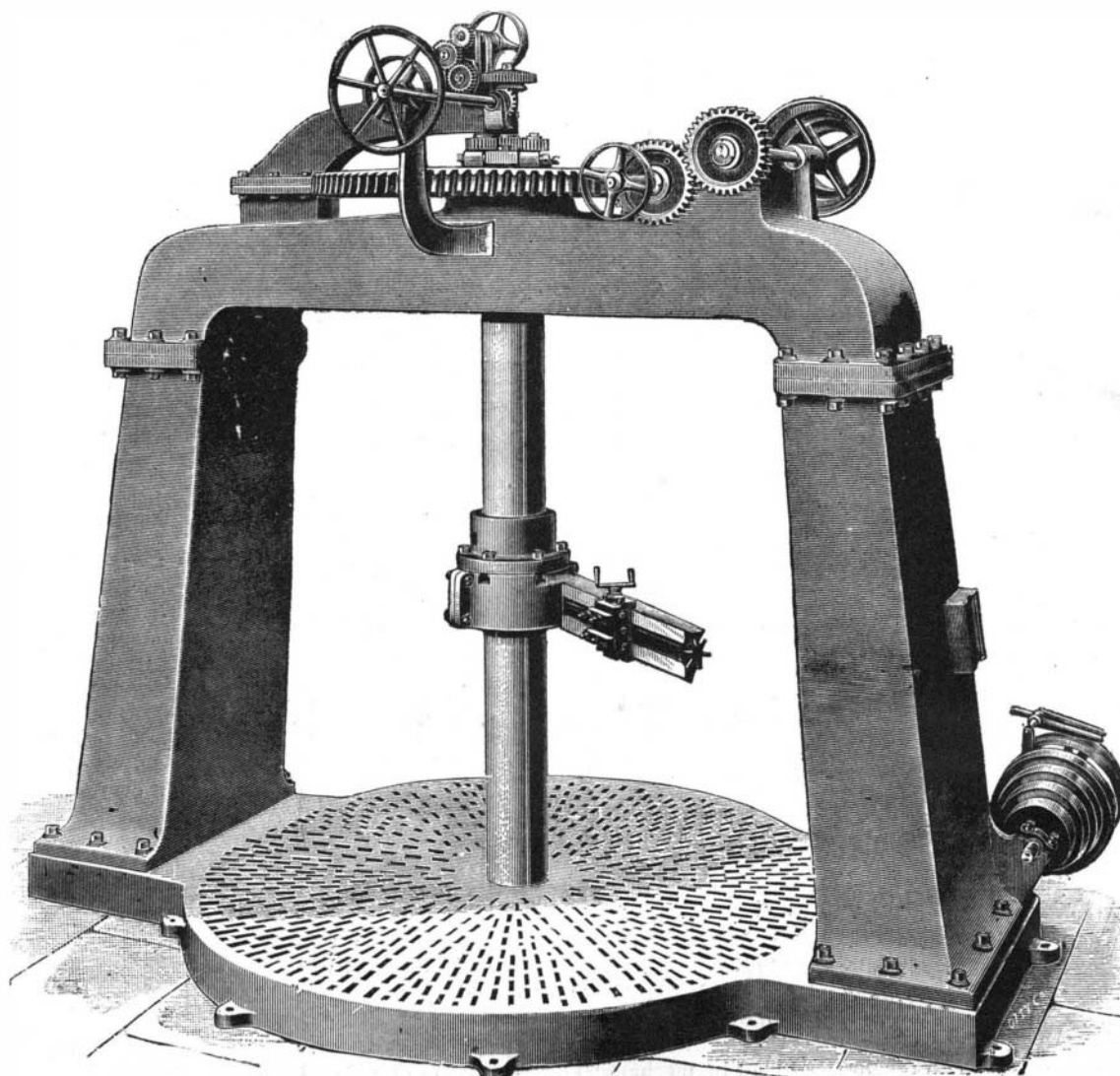
**A New Method of Teaching Chemistry.**

There may be more method than madness in the longing of the American student for a finishing course at a German university. At a recent discourse on chemistry, Prof. Heinrich Hoffman, of Berlin, illustrated the atomic constitution of organic compounds by the use of the ballet. Each girl was dressed in an individual solid color and represented an atom, and the grouping and movements of the atoms is said to have been very effective. Chemistry has now become a very popular study with the students, and the attendance at the lectures very full.

**PARRY'S ROUTING MACHINE.**

fact that between the years 1793 and 1800 no less than 4,314 British ships were captured. Lloyd's register shows that nearly 700,000 British ships enter or leave our home ports annually, that the value of this shipping is £93,000,000, and that the value of the imports and exports is £618,000,000, no less than £140,000,000 of the imports being food. By the aid of quick-firing guns and the position finder we are enabled to carry out the ideal system of defense, viz., few guns in dispersed emplacements concealed by natural features. This system has long been advocated by Sir Andrew Clarke, and it is difficult to see how any further opposition can consistently be offered to it.

At some competitive trials carried out last year by the Admiralty between a 4¼ inch quick-firing gun and a 5 inch service breech-loading gun, the former fired 10 consecutive aimed rounds in 48 seconds, while the latter took 5 minutes 7 seconds to fire the same number.

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